

LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-44 (Cancelled).

Claim 45 (Previously Presented): A method of curing a composition comprising applying the composition to a three-dimensional substrate and curing by plasma in a plasma discharge chamber wherein the composition comprises (d) and either (a), (b), (c), a mixture of (a) and (b), or a mixture of (a) and (c), wherein

(a) is at least one free-radical-polymerisable compound,

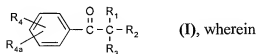
(b) is at least one compound that, under the action of an acid, is able to enter into a polymerisation, polycondensation or polyaddition reaction,

(c) is at least one compound that, under the action of a base, is able to enter into a polymerisation, polycondensation or polyaddition reaction,

and

(d) is at least one photolabile compound that is activatable by plasma discharge selected from the group consisting of formula I, II and IV;

formula I being



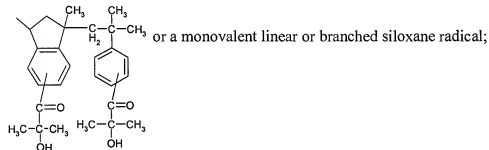
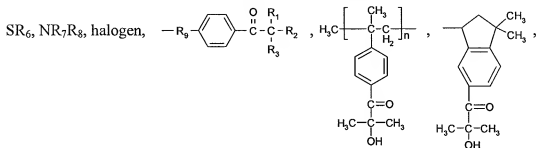
R₁ is C₁-C₁₂alkyl or C₁-C₁₂alkoxy;

R₂ is OR₅ or NR₇R₈;

R₃ is C₁-C₁₂alkyl, C₁-C₁₂alkoxy, C₃-C₁₂alkenyl, phenyl-C₁-C₆alkyl or C₁-C₆alkylphenyl-C₁-C₆alkyl;

or R_1 and R_3 , together with the carbon atom to which they are bonded, form a cyclohexyl ring;

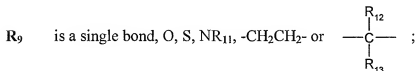
R_4 and R_{4a} are each independently of the other hydrogen, C_1 - C_{12} alkyl, C_1 - C_{12} hydroxyalkyl, OR_5 ,



n is a number from 1 to 10;

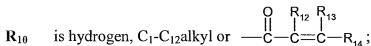
R_5 and R_6 are each independently of the other hydrogen, C_1 - C_{12} alkyl, C_1 - C_{12} alkenyl, phenyl, benzyl, $Si(CH_3)_3$ or $-[C_aH_{12a}X]_b-R_{10}$;

R_7 and R_8 are each independently of the other hydrogen, C_1 - C_{12} alkyl, C_2 - C_5 hydroxyalkyl, or R_7 and R_8 , together with the N atom to which they are bonded, form a 5- or 6-membered ring, which ring is either not further interrupted or is interrupted by one or more O atoms or a NR_{11} group;



a and b are each independently of the other a number from 1 to 12;

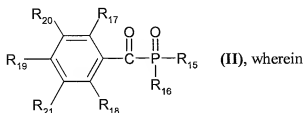
X is S, O or NR_{11} ;



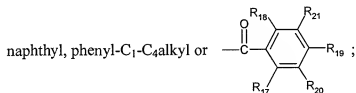
R_{11} is hydrogen, phenyl, phenyl- C_1 - C_4 alkyl, C_1 - C_{12} alkyl or C_2 - C_5 hydroxyalkyl; and

R₁₂, R₁₃ and R₁₄ are each independently of the others hydrogen or methyl;

formula II being



R₁₅ and R₁₆ are each independently of the other C₁-C₁₂alkyl, C₁-C₁₂alkoxy, phenyl, phenyl substituted by one or more OR₂₂, SR₂₃, NR₂₄R₂₅, C₁-C₁₂alkyl or halogen substituents, biphenyl,



R₁₇ and R₁₈ are each independently of the other C₁-C₁₂alkyl, C₁-C₁₂alkoxy, CF₃ or halogen;

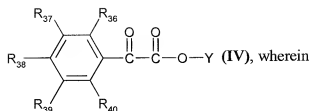
R₁₉, R₂₀ and R₂₁ are each independently of the others hydrogen, C₁-C₁₂alkyl, C₁-C₁₂alkoxy, CF₃ or halogen;

R₂₂ and R₂₃ are each independently of each other hydrogen, C₁-C₁₂alkyl, C₂-C₁₂alkenyl, C₃-C₈cycloalkyl, phenyl, benzyl, C₂-C₂₀alkyl which is interrupted by O atoms or C₂-C₂₀alkyl which is interrupted by O atoms and substituted by OH and/or SH;

R₂₄ and R₂₅ are each independently of each other hydrogen, C₁-C₁₂alkyl, C₂-C₁₂alkenyl, C₃-C₈cycloalkyl, phenyl, benzyl, C₂-C₂₀alkyl which is interrupted by O atoms, C₂-C₂₀alkyl which is interrupted by O atoms and substituted by OH and/or SH; or R₂₄ and R₂₅, together with the N atom to which they are bonded, form a 5- or 6-membered ring, which ring is uninterrupted or is interrupted by O, S or an NR₂₆ group; and

R₂₆ is hydrogen, phenyl, phenyl-C₁-C₄alkyl, C₁-C₁₂alkoxy, C₁-C₁₂alkyl or C₁-C₁₂hydroxyalkyl;

and formula IV being



R₃₆, R₃₇, R₃₈, R₃₉ and R₄₀ are each independently of the others hydrogen, halogen, OR₄₂, SR₄₃, NR₄₄R₄₅, C₁-C₁₂alkyl, C₁-C₁₂alkyl substituted by OH, C₁-C₄alkoxy, phenyl, naphthyl, halogen, CN and/or -OCOR₄₁, C₂-C₁₂alkyl which is interrupted by one or more O atoms, monovalent linear or branched siloxane radical, phenyl or phenyl substituted by one or two C₁-C₄alkyl and/or one or two C₁-C₄alkoxy substituents;

R₄₁ is C₁-C₈alkyl, phenyl or phenyl substituted by from one to three C₁-C₄alkyl and/or one to three C₁-C₄alkoxy substituents;

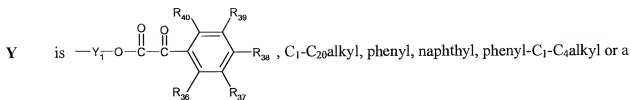
R₄₂ and R₄₃ are each independently of the other hydrogen, C₁-C₁₂alkyl, C₁-C₁₂alkyl substituted by OH, C₁-C₄alkoxy, phenyl, phenoxy and/or -OCOR₄₁, C₂-C₁₂alkyl which is interrupted by one or more O atoms, C₃-C₆alkenyl, cyclopentyl, cyclohexyl, naphthyl, phenyl or phenyl substituted by C₁-C₄alkoxy, phenyl and/or C₁-C₄alkyl;

R₄₄ and R₄₅ are each independently of the other hydrogen, C₁-C₁₂alkyl, C₁-C₁₂alkyl substituted by OH, C₁-C₄alkoxy and/or phenyl, C₂-C₁₂alkyl which is interrupted by one or more O atoms, phenyl, -COR₄₁, SO₂R₄₆, or R₄₄ and R₄₅, together with the nitrogen atom to which they are bonded, form a 5-, 6- or 7-membered ring, which ring is uninterrupted or interrupted by -O- or -NR₄₇-;

or the substituents OR₄₂, SR₄₃, and NR₄₄R₄₅ form a 5- or 6-membered by way of the radicals R₄₂, R₄₃, R₄₄ and/or R₄₅ with further substituents on the phenyl ring or with one of the carbon atoms of the phenyl ring;

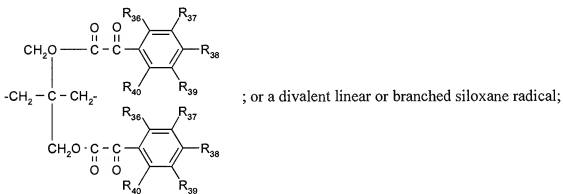
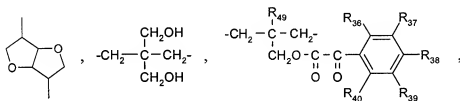
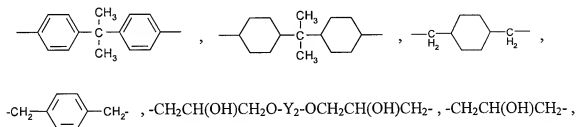
R₄₆ is C₁-C₁₂alkyl, phenyl or 4-methylphenyl;

R₄₇ is hydrogen, C₁-C₈alkyl, C₁-C₈alkyl substituted by OH or C₁-C₄alkoxy, phenyl or phenyl substituted by OH, C₁-C₄alkyl or C₁-C₄alkoxy;

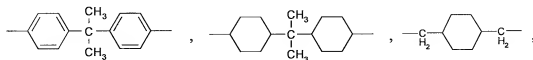


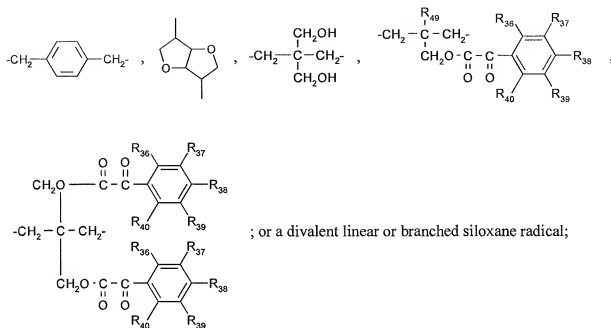
monovalent linear or branched siloxane radical;

Y_1 is phenylene, $\text{C}_1\text{-C}_{12}$ alkylene, $\text{C}_4\text{-C}_8$ alkenylene, $\text{C}_4\text{-C}_8$ alkynylene, cyclohexylene, $\text{C}_4\text{-C}_{40}$ alkylene interrupted by one or more $-\text{O}-$, $-\text{S}-$ or $-\text{NR}_{48}-$, a group



Y_2 is phenylene, $\text{C}_1\text{-C}_{12}$ alkylene, $\text{C}_4\text{-C}_8$ alkenylene, $\text{C}_4\text{-C}_8$ alkynylene, cyclohexylene, $\text{C}_4\text{-C}_{40}$ alkylene interrupted by one or more $-\text{O}-$, $-\text{S}-$ or $-\text{NR}_{48}-$, a group





R₄₈ is hydrogen, C₁-C₁₂alkyl or phenyl; and

R₄₉ is hydrogen, CH₂OH or C₁-C₄alkyl.

Claim 46 (Previously Presented): A method according to claim 45, wherein component (d) in the composition is at least one compound selected from the group consisting of formula I and II.

Claim 47 (Withdrawn): A method of curing a composition comprising applying the composition to a three-dimensional substrate and curing by plasma in a plasma discharge chamber wherein the composition comprises (d) and either (a), (b), (c), a mixture of (a) and (b), or a mixture of (a) and (c), wherein

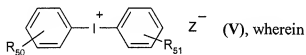
(a) is at least one free-radical-polymerisable compound,

(b) is at least one compound that, under the action of an acid, is able to enter into a polymerisation, polycondensation or polyaddition reaction,

(c) is at least one compound that, under the action of a base, is able to enter into a polymerisation, polycondensation or polyaddition reaction,
and

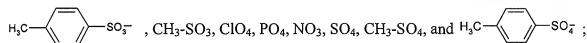
(d) is at least one photolabile compound that is activatable by plasma discharge selected from the group consisting of formula V, VI, VII and VIIa,

formula V being

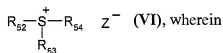


R₅₀ and **R₅₁** are each independently of the other hydrogen, C₁-C₂₀alkyl, C₁-C₂₀alkoxy, OH-substituted C₁-C₂₀alkoxy, halogen, C₂-C₁₂alkenyl, cycloalkyl; and

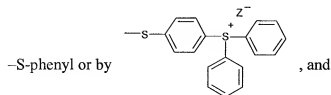
Z is an anion selected from PF₆, SbF₆, AsF₆, BF₄, (C₆F₅)₄B, Cl, Br, HSO₄, CF₃-SO₃, F-SO₃,



formula VI being

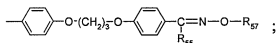
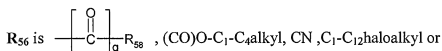
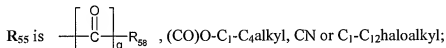
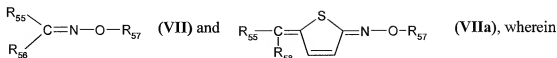


R₅₂, **R₅₃** and **R₅₄** are each independently of the others unsubstituted phenyl, or phenyl substituted by

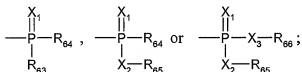


Z is as defined above;

formula VII and formula VIIa being



R_{57} is $\text{C}_1\text{-C}_{18}$ alkylsulfonyl, $\text{C}_1\text{-C}_{10}$ haloalkylsulfonyl, camphorylsulfonyl, phenyl- $\text{C}_1\text{-C}_3$ alkylsulfonyl, $\text{C}_3\text{-C}_{30}$ cycloalkylsulfonyl, phenylsulfonyl, naphthylsulfonyl, anthracylsulfonyl or phenanthrylsulfonyl, unsubstituted or substituted by one or more halogen, $\text{C}_1\text{-C}_4$ haloalkyl, CN, NO_2 , $\text{C}_1\text{-C}_{16}$ alkyl, phenyl, $\text{C}_1\text{-C}_4$ alkylthio, $\text{C}_1\text{-C}_4$ alkoxy, phenoxy, $\text{C}_1\text{-C}_4$ alkyl- $\text{O}(\text{CO})$ -, $\text{C}_1\text{-C}_4$ alkyl- $(\text{CO})\text{O}$ -, $\text{R}_{67}\text{OSO}_2$ - and/or $-\text{NR}_{60}\text{R}_{61}$ substituents; $\text{C}_2\text{-C}_6$ haloalkanoyl, halobenzoyl,



X_1 , X_2 and X_3 are each independently of the others O or S;

q is 0 or 2;

R_{58} is $\text{C}_1\text{-C}_{12}$ alkyl, cyclohexyl, camphoryl, unsubstituted phenyl, or phenyl substituted by one or more halogen, $\text{C}_1\text{-C}_{12}$ alkyl, OR_{59} , SR_{59} or $\text{NR}_{60}\text{R}_{61}$ substituents;

R_{59} is $\text{C}_1\text{-C}_{12}$ alkyl, phenyl, phenyl- $\text{C}_1\text{-C}_4$ alkyl or $\text{C}_1\text{-C}_{12}$ hydroxyalkyl;

R_{60} and R_{61} are each independently of the other hydrogen, $\text{C}_1\text{-C}_4$ alkyl, $\text{C}_2\text{-C}_6$ hydroxyalkyl, or R_{60} and R_{61} , together with the N atom to which they are bonded, form a 5- or 6-membered ring, which ring is uninterrupted or interrupted $[[\text{by O}]]$ by O or an NR_{62} group;

R_{62} is hydrogen, phenyl, phenyl- $\text{C}_1\text{-C}_4$ alkyl, $\text{C}_1\text{-C}_{12}$ alkyl or $\text{C}_2\text{-C}_5$ hydroxyalkyl;

R₆₃, **R₆₄**, **R₆₅** and **R₆₆** are each independently of the others C₁-C₆alkyl, C₁-C₆haloalkyl, phenyl or phenyl substituted by C₁-C₄alkyl or halogen; and

R₆₇ is hydrogen, C₁-C₄alkyl, phenyl or tolyl.

Claim 48 (Previously Presented): The method according to claim 45, wherein the composition comprises, in addition to the photolabile component (d), other additives (h), sensitizer compounds (f) and/or dyes or pigments (g).

Claim 49 (Previously Presented): The method according to claim 48, wherein the composition comprises at least one light stabilizer or/and at least one UV absorber compound.

Claim 50 (Previously Presented): The method according to claim 45, wherein the composition is a surface coating.

Claim 51 (Previously Presented): The method according to claim 45, wherein the composition is a printing ink.

Claim 52 (Previously Presented): The method according to claim 45, wherein the composition comprises as polymerizable component solely free-radical-polymerizable compounds (a).

Claim 53 (Previously Presented): The method according to claim 52, wherein the free-radical-polymerizable compound comprises at least one compound selected from the group

consisting of mono-, di-, tri- or tetra-functional acrylate monomers and mono-, di-, tri- or tetra-functional acrylate-functional oligomers.

Claim 54 (Previously Presented): The method according to claim 45, wherein the composition comprises as polymerisable component solely cationically polymerisable or crosslinkable compounds (b).

Claim 55 (Previously Presented): The method according to claim 45, wherein the composition comprises as polymerisable component a mixture of at least one free-radical-polymerisable compound (a) and at least one cationically polymerisable compound (b).

Claim 56 (Previously Presented): The coated substrate which is coated on at least one surface by means of the method according to claim 54.

Claim 57 (Previously Presented): A coating obtained by a method according to claim 45.

Claim 58 (Withdrawn): A method of curing a composition wherein the composition comprises

(1) a combination of at least one electron acceptor maleimide compound and at least one electron donor vinyl ether compound; and

(2) optionally at least one free-radical-polymerisable compound (a),
wherein the curing is carried out in a plasma discharge chamber.

Claim 59 (Previously Presented): The method according to claim 45 of curing a composition wherein the composition comprises (a), (d) and either (a1), (a2) or a mixture of (a1) and (a2) wherein

(a) is at least one free-radical-polymerisable component having at least one ethylenically unsaturated double bond, the free-radical-polymerisable component optionally additionally being functionalised with OH, NH₂, COOH, epoxy or NCO groups;

(a1) is a mixture of at least one compound selected from the group consisting of polyacrylates and polyester polyols, and at least one compound selected from the group consisting of melamine, melamine derivatives and blocked or non-blocked polyisocyanates;

(a2) is a mixture of at least one compound selected from the group consisting of carboxyl-, anhydride- or amino-functional polyesters and carboxyl-, anhydride- or amino-functional polyacrylates, and at least one compound selected from the group consisting of epoxy-functional polyesters and polyacrylates;

and

(d) is at least one photolabile compound of that is activatable by plasma discharge selected from the group consisting of formula I, II, and IV;

wherein

the curing of the composition is carried out in a plasma discharge chamber and, optionally, thermal pre- or after-treatment is carried out.

Claim 60 (Previously Presented): The method of curing a composition according to claim 45 for producing mouldings from composite materials, wherein a support is impregnated with the composition and introduced into a mould; wherein the curing is carried out in a plasma discharge chamber and, optionally, thermal aftertreatment is carried out.

Claim 61 (Withdrawn): The method according to claim 47, wherein the composition comprises, in addition at least one light stabiliser and/or at least one UV absorber compound and optionally other additives (h), sensitiser compounds (f) or dyes or pigments (g).

Claim 62 (Withdrawn): The method according to claim 47, wherein the composition is a surface coating.

Claim 63 (Withdrawn): The method according to claim 47, wherein the composition comprises as polymerisable component solely cationically polymerisable or crosslinkable compounds (b).

Claim 64 (Withdrawn): The method according to claim 47, wherein the composition comprises as polymerisable component a mixture of at least one free-radical-polymerisable compound (a) and at least one cationically polymerisable compound (b).

Claim 65 (Withdrawn): The method according to claim 47 of curing a composition wherein the composition comprises (a), (d) and either (a1), (a2) or a mixture of (a1) and (a2) wherein

(a) is at least one free-radical-polymerisable component having at least one ethylenically unsaturated double bond, the free-radical-polymerisable component optionally additionally being functionalised with OH, NH₂, COOH, epoxy or NCO groups; and

(a1) is a mixture of at least one compound selected from the group consisting of polyacrylates and polyester polyols, and at least one compound selected from the group consisting of melamine, melamine derivatives and blocked or non-blocked polyisocyanates;

(a2) is a mixture of at least one compound selected from the group consisting of carboxyl-, anhydride- or amino-functional polyesters and carboxyl-, anhydride- or amino-functional polyacrylates, and at least one compound selected from the group consisting of epoxy-functional polyesters and polyacrylates;

and

(d) is at least one photolabile compound of that is activatable by plasma discharge selected from the group consisting of formula V, VI, VII and VIIa;

wherein

the curing of the composition is carried out in a plasma discharge chamber and, optionally, thermal pre- or after-treatment is carried out.

Claim 66 (Withdrawn): The method of curing a composition according to claim 47 for producing mouldings from composite materials, wherein a support is impregnated with the composition and introduced into a mould; wherein the curing is carried out in a plasma discharge chamber and, optionally, thermal aftertreatment is carried out.

Claim 67 (Withdrawn; Currently Amended): A method of curing a composition according to claim 45 wherein (d) comprises at least one ~~compound~~ compound of formula I and one compound of formula II.